DHD20130218 (r434+)
Wireless TRV (& boiler) controller V0.09
18M2+ PICAXE, DS18B20, RFM22, DS1306

UC1 PICAXE 18M2+ microcontroller
Reg1 3V3 low-dropout regulator TS2950CT-3.3 eg Maplin N68CA
TS1 DS18B20 1-wire temperature sensor
LDR1 light dependent resistor such as SEN002/techsupplies.co.uk
  (like GL5528 1M+ dark, ~10k @ 10 Lux)
LED1 'Call for heat' and mode LED.
LED2 'Boiler on' (optional)
RTC1 DS1306 (optional) w/ supercap backup
RAD1 RFM22B 868MHz radio module
XTAL1 32768Hz 6pf load watch crystal
C3 supercap to maintain time, or short to GND
  0F1 should be good for ~100h backup

POWER max ~30mA
5V or 3xAA @ ~3.6V+
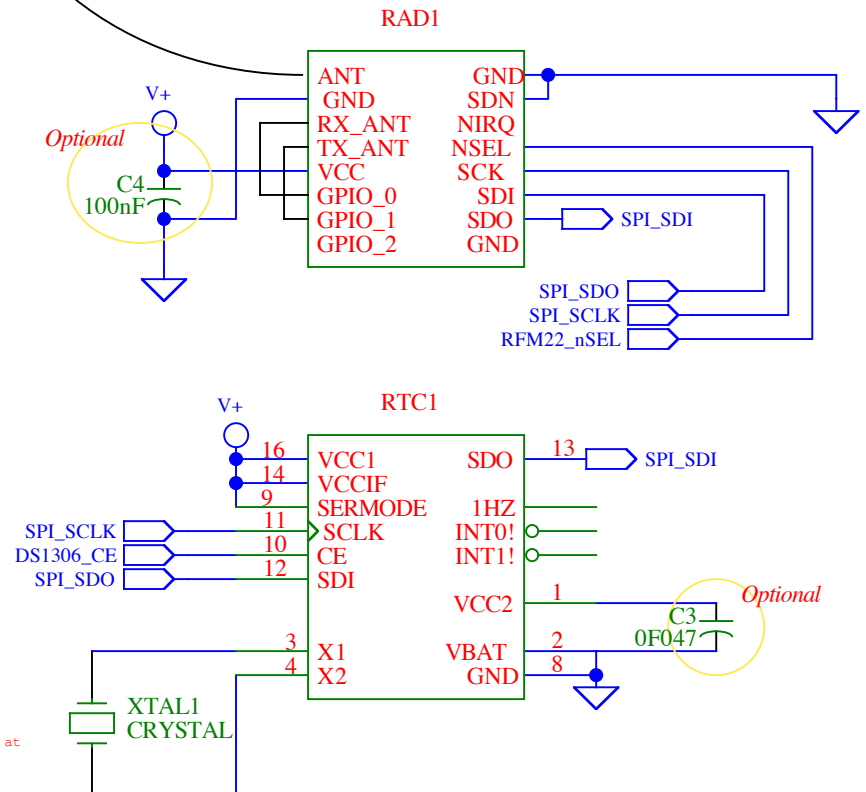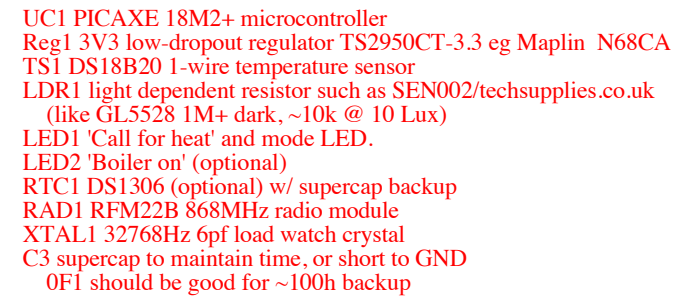
V+

Reg1
3V3

C1
10uF

C2
10uF

V+

R3
4K7

C.5

Serial / AXE027

R1
22K

R2
10k

Direct boiler control
(eg via SSR: H is on)

R10
4K7

Optional

LED2
LED

V+

R11
4K7

C.2

UC1
PICAXE 18M2+

V+ (p14)
OV (p5)
C.5 In (p4)

C.3 / SerOut (p2)
C.4 / SerIn (p3)

B.0 (p6)

B.1 i2c SDA (p7)
B.4 i2c SCL (p10)

B.2 (p8)
B.3 (p9)

C.6 (p15)

B.5 (p11)
B.6 (p12)

C.2 In/Out (p1)

C.7 (p16)
C.0 (p17)

C.1 (p18)

B.7 (p13)

V+

R4
4K7

TS1

2
DQ

V+

LDR1

Optional

R5
100K

V+

B1.A

R6
4K7

R7
470R

LED1
LED

V+

R8
4K7

V+

R9
4K7

SDA
SCL

SPI_SCLK
SPI_SDO

SPI_SDI

RFM22_nSEL
DS1306_CE

RAD1

ANT
GND
RX_ANT
TX_ANT
VCC
GPIO_0
GPIO_1
GPIO_2

GND
SDN
NIRQ
NSEL
SCK
SDI
SDO
GND

V+

Optional

C4
100nF

SPI_SDI

SPI_SDO
SPI_SCLK
RFM22_nSEL

RTC1

V+

16 VCC1
14 VCCIF
9   SERMODE
11 SCLK
10 CE
12 SDI

SDO 13
1HZ
INT0!
INT1!
VCC2 1
VBAT 2
GND 8

SPI_SDI

SPI_SCLK
DS1306_CE
SPI_SDO

3 X1
4 X2

XTAL1
CRYSTAL

Optional

C3
0F047

Author(s): Damon Hart-Davis 2013